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upon the action of *Dionæa* and *Drosera*—a capital subject for Mr. Darwin's handling.

Apropos to these papers, which furnish excellent illustrations of it, let us recognize Darwin's great service to natural science in bringing back to it Teleology: so that, instead of Morphology *versus* Teleology, we shall have Morphology wedded to Teleology. To many, no doubt, Evolutionary Teleology comes in such a questionable shape as to seem shorn of all its goodness; but they will think better of it in time, when their ideas become adjusted, and they see what an impetus the new doctrines have given to investigation. They are much mistaken who suppose that Darwinism is only of speculative importance and perhaps transient interest. In its working applications it has proved to be a new power, eminently practical and fruitful.

And here, again, we are bound to note a striking contrast to Mr. Brown, greatly as we revere his memory. He did far less work than was justly to be expected from him. Mr. Darwin not only points out the road, but labors upon it indefatigably and unceasingly. A most commendable *noblesse oblige* assures us that he will go on while strength (would we could add health) remains. The vast amount of such work he has already accomplished might overtax the powers of the strongest. That it could have been done at all under constant infirm health is most wonderful.

A KEY TO THE HIGHER ALGÆ OF THE ATLANTIC COAST, BETWEEN NEWFOUNDLAND AND FLORIDA.

BY PROF. D. S. JORDAN.

PART II. RHODOSPERMEÆ.

(RED ALGÆ).

PLANTS rosy red or purple, rarely brown-red or greenish red, becoming, when exposed to sunlight, dull green or yellowish. Fructification of two kinds; diceious:—1. *Spores* contained either in external or immersed conceptacles, or densely aggregated together and dispersed in masses throughout the substance of the frond; 2. *Tetraspores*, red or purple, either external or immersed

in the frond, rarely contained in proper receptacles; each tetraspore enveloped in a pellucid skin, and at maturity splitting into four sporules. Antheridia filled with yellow or hyaline corpuscles. Ours all marine (except *Bostrychia*), and chiefly below low water mark. **A**

A. *Frond calcareous, rigid: its cells containing Carbonate of Lime,* **CORALLINACEÆ. P**

A. *Frond expanding horizontally, lichen-like, but not calcareous,* **SQUAMARIÆ. V**

A. *Frond not calcareous nor lichenoid,* **B**

B. *Frond mostly cylindrical, partly or entirely articulate,* **C**

B. *Frond not articulate anywhere,* **G**

C. *Nodes much constricted,* **D**

C. *Nodes not specially constricted,* **E**

D. *Joints obvious throughout, long in the main stems and gradually shorter above, spherical at the tips; color bright, sometime gold-tinted,* . . . **GRIFFITHSIA in CERAMIACEÆ. d**

D. *Terminal joints not spherical: colors duller, often greenish,* . . . **CHAMPIA in LAURENCIACEÆ. w**

E. *Sporiferous nucleus in external spherical conceptacles: axis polysiphonous (of 4 or more tubes): joints not distinct on older parts of frond,* . . . **RHODOMELACEÆ. M**

E. *Axis monosiphonous: joints usually obvious: colors mostly bright,* **F**

F. *Branches beset with short, fine, mostly simple filaments* . . . **SPYRIDACEÆ. f**

F. *Not as above; mostly profusely branching; frond sometimes two edged,* **CERAMIACEÆ. d**

G. *Frond flat, with an evident midvein,* **SPHÆROCOCOIDEÆ. Q**

G. *Frond without a midvein,* **H**

H. *Sporiferous nucleus consisting of tufted spore-threads attached to a placenta; single spores in each cell of the spore thread, or only in the terminal cell. (Fronds rarely flat or fan-shaped, mostly less leathery in texture than the next.)* **J**

- H.** *Sporiferous nucleus subglobose, either simple or formed of many nucleoli; numerous spores without order in a membranaceous mother-cell. (Fronds leathery, often large, and rarely adhering closely to paper.)* . . . **I**
- I.** *Frond composed of polygonal cells; often flat or fan-shaped,*
RHODYMENIACEÆ. **X**
- I.** *Fronds various, rarely truly fan-shaped; the ultimate structure being jointed filaments compacted together by gelatine,* CRYPTONEMIACEÆ. **Z**
- J.** *Nucleus in an external, ovate or spherical conceptacle,* . **K**
- J.** *Nucleus not as above; cylindrical, dichotomously forked,* **L**
- K.** *Cylindrical; branches mostly tapering towards base and apex; superficial cellules very minute,*
GELIDIACEÆ. **T**
- K.** *Cylindrical or flat; surface covered with small cells; branches not tapering to base (except in CHONDRIA)*
RHODOMELACEÆ. **M**
- K.** *Without above combinations; frond flat in our species,*
SPHÆROCOCOIDEÆ. **Q**
- L.** *Nucleus in wart-like excrescences; frond fan-shaped; apices attenuate, of equal length,* . SPONGIOCARPEÆ. **U**
- L.** *Nucleus immersed in the frond; apices blunt,*
HELMINTHOCLADEÆ. **W**
- M.** *Frond cylindrical, at least the branchlets or younger parts articulate,* **N**
- M.** *Frond not articulate anywhere,* **O**
- N.** *Frond elongated; main stem mostly inarticulate, but thickly beset with fine jointed branching filaments which bear the fruit,* *Dasya.* **v**
- N.** *Joints of frond, longitudinally striate; mostly dark red, and profusely branching,* *Polysiphonia.* **m**
- N.** *Frond tessellated with oblong or squarish, purple cells; small—about 1 inch high,* *Bostrychia.* **u**
- O.** *Frond flat, pinnatifid; obscurely midribbed,* . . *Odonthalia.* **g**
- O.** *Cylindrical; branches tapering toward the base,* . *Chondria.* **h**
- O.** *Cylindrical; branches not tapering to base,* . . *Rhodomela.* **k**
- P.** *Frond pinnate: jointed; 2 to 4 inches high,* . . . *Corallina.* **x**
- P.** *Frond lobed or orbicular, attached by its base or centre,* . . .
Melobesia. **y**
- P.** *Frond a red incrustation on rocks in deep water, Nullipora (?).* **z**

- Q. Tetraspores in definite sori; frond flat, with a midvein, . . . **R**
- Q. Frond flat, without a midvein; spores not in sori, . . . **S**
- R. Delicate, rosy red; lamina unbranched; no lateral veins, . . . *Grinnellia*. **A²**
- R. Fronds with veins and veinlets or else branched, . . . *Delesseria*. **B²**
- S. Frond compressed in our species, lacinate, . . . *Gracilaria*. **E²**
- S. Frond flat, laciniate, delicate and rosy, often veiny, *Nitophyllum*. **C²**
- S. Frond flat, leathery, margined with wing-like segments, . . . *Calliblepharis*. **D²**
- T. Frond slightly compressed; branchlets slender at base, *Gelidium*. **F²**
- T. Coarser; cylindrical; succulent and flaccid, . . . *Solieria*. **G²**
- T. Frond filiform, much branched; branches clothed with small pointed branchlets, . . . *Hypnea*. **H²**
- U. Dark brown, cartilaginous; not adhering to paper, . . . *Polyides*. **I²**
- V. Suborbicular; red-black, . . . *Peyssonnelia*. **J²**
- W. Regularly dichotomous and level-topped, . . . *Scinaia*. **L²**
- W. Sparingly dichotomous; worm-like, . . . *Nemalion*. **K²**
- X. Frond flat, fan-shaped, multifid, . . . **Y**
- X. Frond linear, two-edged, pectinate-pinnatifid, . . . *Plocamium*. **O²**
- X. Frond terete, alternately decompound, . . . *Cordylecladia*. **P²**
- Y. Frond stipitate, palmately cleft; usually large and dark, . . . *Rhodymenia*. **M²**
- Y. Roseate; dichotomously or pinnately multifid, . . . *Euthora*. **N²**
- Z. More or less flattened or compressed, . . . **a**
- Z. Cylindrical, . . . **b**
- a. Frond stipitate, regularly fan-shaped, very variable in color and form; shallow water, . . . *Chondrus*. **W²**
- a. Frond stipitate, irregularly cleft, proliferous; deeper water, . . . *Phyllophora*. **Q²**
- a. *Channelled on one side, convex on the other; covered with little tubercles or frondlets, . . . *Gigartina*. **V²**
- a. Frond rigid, 2 to 3 inches high; dichotomous; axils rounded; apices blunt, . . . *Gymnogongrus*. **R²**
- a. Frond 1 to 2 feet long; margin fringed, with frondlets, . . . *Grateloupia*. **a²**
- a. Frond broad, palmate, fringed with cilia; brilliant. *Callophyllis*. **U²**
- b. Frond stiff, very rigid and horny; axils rounded, . . . *Ahnfeltia*. **S²**
- b. Frond very bushy; branchlets with a chain of swollen nodes containing conceptacles, or else tendril bearing, . . . *Cystoclonium*. **T²**
- b. Frond delicate, much branched, adhering closely to paper, *Gloi-osiphonia*. **b²**
- b. Not as above, and less common, . . . **c**
- c. Frond hollow, simple or with similar hollow branches, . . . *Halosaccion*. **Y²**
- c. Branchlets mostly opposite and tapering to base; usually secund or arching, stem constricted, adheres to paper, *Chylocladia*. **X²**

- c. Fronds level topped, dichotomous; axils and apices acute; ends
in fruit swollen into pod-shaped receptacles, . . . *Furcellaria*. **Z²**
- d. Frond decidedly constricted at the nodes, . . . *Griffithsia*. **j²**
- d. Frond two edged, decompound pinnate, pinnæ opposite, *Ptilota*. **g²**
- d. Frond filiform, **e**
- e. Tetraspores sunk in the frond; axils rounded; branches dichoto-
mous and commonly ending in little forks, which are often
incurved, *Ceramium*. **d²**
- e. Tetraspores external; much branched; rarely dichotomous or
with the apices hooked, *Callithamnion*. **k²**
- e. Tetraspores external; whorls of short, curved branchlets at the
nodes, *Halurus*. **i²**
- f. Surface coated with small cells, *Spyridia*. **c²**
- g. Pinnately decompound; axils obtuse, apices acute, **54**
- h. Branchlets club-shaped, obtuse, **i**
- h. Branchlets acute at each end, **j**
- i. Stem stout, mostly excurrent, **55**
- i. Slender, generally forking near base, **56**
- j. Frond slender, with setaceous branchlets, **57**
- j. Stout, with thick branchlets, **58**
- k. Substance soft, closely adhering to paper, **l**
- k. Rather rigid; scarcely adhering to paper, **59**
- l. Brownish red, pinnately much branched, **60**
- l. Rosy, staining paper; more slender and regularly pinnate, . . **61**
- m. Primary tubes four only, **n**
- m. Primary tubes 6 to 25, **s**
- n. Visibly articulate throughout; dissepiments pellucid, . . . **o**
- n. Stem and larger branches apparently not jointed, **r**
- o. Branches widely spreading, beset with spine-like branchlets, . **p**
- o. Branches not spinous nor divaricate, **g**
- p. Rigid and bushy; not collapsing when drawn from the water;
joints very short, **66**
- p. Flaccid and silky; joints longer, **65**
- q. Dark; tips with tufts of roseate fibrils, **64**
- q. Full red; in small dense tufts or wads which adhere closely to
paper, **63**
- q. Coarser; less densely tufted; scarcely adhering, **62**
- r. Red brown; branches long, twig-like, sometimes with pencils of
fine rosy branchlets; stem scarcely adhering to paper, . . **67**
- r. Dull, brownish; tips fibrilliferous; joints striate; adhering to
paper, **68**
- r. Brighter colored, more branched and with longer joints, . . **69**
- s. Pinnately much branched, scarcely jointed; branches mostly
naked below and pinnate above; blackish; substance rigid
and wiry, not adhering closely to paper; excessively varia-
ble, **73**
- s. Internodes long; branches feathery at the tips; adheres to
paper; a deep water variety of No. 73 (?) **74**

s.	Forming globose, rigid, dark brown tufts on <i>Fucus nodosus</i> ; joints mostly short, with a dark central spot,	75
s.	Small, rigid, full red, distichous, many times pinnate, with sub- ulate pinnules,	71
s.	With none of the above combinations of characters,	t
t.	Dichotomous or zigzag; bright purplish, adhering to paper,	70
t.	Densely tufted; not dichotomous; full red; scarcely adhering	72
u.	River mouths, etc., sometimes in fresh water,	76
v.	Bright red, closely adhering to paper,	77
w.	Shallow water, etc.; adheres to paper; variable,	78
x.	Lurid purple; green when exposed, white when bleached,	79
y.	Others probably occur; S. T. Olney mentions No.	80
z.	Common on the Mass. coast; said by Mr. Bicknell to be No.	81
A. ²	Brilliant, very delicate; adhering closely,	82
B. ²	Fronds like oak-leaves; pinnatifid or sinuate; deep water,	83
B. ²	Alternately or dichotomously branched; roseate,	84
B. ²	Frond undivided, proliferously branched from the midvein,	85
B. ²	Frond dichotomous; constricted, almost jointed at the nodes, rooting or proliferous at the forks; purple,	86
C. ²	Frond somewhat rigid; sori oblong,	87
C. ²	Frond soft, thin, flaccid; sori round,	88
D. ²	Dark red-purple; apices sometimes cirrhous,	89
E. ²	Much divided; conceptacles prominent; variable,	90
F. ²	Purplish; rather rigid,	91
G. ²	Dark or blood-red; adheres to paper; variable,	92
H. ²	Branches which bear tetraspores, pod-like in the middle,	93
I. ²	Very dark red-brown; does not adhere to paper,	94
J. ²	Red-black; margin paler,	95
K. ²	Dull purplish, adhering to paper,	96
L. ²	Rosy red; level-topped; tender,	97
M. ²	Tetraspores in cloudy patches; large; common,	98
M. ²	Tetraspores in distinct sori; small; rare,	99
N. ²	Bright crimson; scarcely adhering to paper,	100
O. ²	Lower branchlets entire; upper pectinate,	101
P. ²	Livid purple; sometimes compressed; densely tufted,	102
Q. ²	Tetraspores in excrescences (nemathecia) at the tips of the lam- inæ; clear red,	103
Q. ²	Nemathecia forming dark colored, convex patches at the centre of the laminæ; dull red,	104
R. ²	Compressed; segments forked at tips,	105
R. ²	Flat; axils very much rounded,	106
S. ²	Densely tufted; wiry; does not collapse,	107
T. ²	Fruiting branches mostly tapering to base; excessively variable,	108
U. ²	Bright red; palmate; rare,	109
V. ²	Dark red; rigid and dichotomous,	110
W. ²	Often iridescent; greenish in shallow water and bleaching to white; sori purplish, like drops of blood; common,	111
X. ²	Much divaricate; branches tubular,	112

- X.²** Pinnate; branches mostly opposite and compound, **113**
- Y.²** Very densely tufted; often distorted; livid purple, **114**
- Z.²** Similar, except in fruit, to *Polyides*, **115**
- a.²** Frond multifid; laciniae very long, **116**
- a.²** Frond pinnately decompound, **117**
- b.²** Much branched; older parts hollow, **118**
- c.²** Branches spreading; covered with small branchlets, **119**
- c.²** Branches straggling; often revolute; shorter and stouter, **120**
- d.²** Internodes entirely diaphanous; surface cells only at the nodes, **e²**
- d.²** Coarser; internodes not entirely diaphanous; common and variable, **121**
- e.²** Joints everywhere as long as broad; of a single colored cell; forming mats on rocks, **122**
- e.²** Frond of equal diameter throughout; lower joints rosy; 4 to 6 times as long as broad; upper shorter, **124**
- e.²** Attenuated above: lower joints 3-4 times as long as broad, . . . **f**
- f.²** Nodes swollen: internodes pellucid, **123**
- f.²** Nodes not swollen: lower internodes striate, **125**
- g.²** Pinnæ opposite, unlike; the one undivided leaf-like, the other branch-like pinnately-compound, **126**
- g.²** Pinnæ opposite, mostly similar, **h²**
- h.²** Pinnæ articulated: dark purple: adheres to paper, **128**
- h.²** Pinnæ unequal: northern: rare in America, **127**
- i.²** Branchlets very numerous, incurved, **129**
- j.²** Adheres closely to paper: common: variable, **130**
- k.²** Frond shrub-like, pyramidal, with an excurrent main stem which is not obviously articulate, **l²**
- k.²** Frond shrub-like, or alternately decompound, with dichotomous branchlets: color *not* rose-purple: commonly drying pale or brown red, **o²**
- k.²** Fronds alternately decompound: a pair of minute opposite branchlets at each node; mostly brilliant, **p²**
- k.²** Branchlets few and distant, with whorls of opposite fibres at apex, **149**
- k.²** Without above characters: an inch or more high, densely tufted, mostly rose-purple, and obviously jointed throughout, **m²**
- k.²** Frond $\frac{1}{4}$ -1 inch, arising from creeping, matted threads, . . . **144**
- k.²** Frond $\frac{1}{4}$ inch or less high: parasitic, not rising from matted threads, and mostly but slightly branched, **r²**
- l.²** Joints in branches twice as long as broad, **131**
- l.²** Joints in branches 3-4 times as long as broad: nodes swollen, . **132**
- m.²** Plumules fan-shaped, bare of branches in the lower half, . . . **133**
- m.²** Pinnate: plumules with zigzag rachis: joints of branches 10 times as long as broad, **136**
- m.²** Without above characters, **n²**
- n.²** Densely tufted: bright rose purple: filaments finer than human hair: joints 3-8 times as long as broad, **135**

- n.² Somewhat coarser, with shorter joints: plumules distichous, 134
- o.² Slender, shrub-like, distinguished at once from other *Callithamnia* by the bead-like chains of fruit (seiospores): common, often greenish: (Formerly and perhaps more properly considered as the type of a separate genus, as *Seiospora Griffithsiana* Harv.), 138
- o.² Articulate throughout, branches ending in little corymbs of branchlets, 137
- p.² Branchlets pectinate, secund, recurved, on the upper side only of branches: a beautiful and rare little species: specimens of which were found at Penikese in 1873, by Miss Susan Bowen, 139
- p.² Branchlets simple, subulate, 142
- p.² Branchlets, or some of them in fours, pinnate, 143
- p.² Without above characters; branchlets opposite, pinnate, or bipinnate, q²
- q.² Joints 4-10 times as long as broad: brilliant: frequent, 140
- q.² Joints shorter: less common, 141
- r.² Forming a dense purple fringe on *Zostera*: branches long, secund, 145
- r.² Forming crimson patches on rocks: branches long, erect, 146
- r.² Forming velvety tufts on *Dasya*: branches bud-like, secund, 147
- r.² Forming a fleecy, pink-down on *Ceramium rubrum*: branches spreading, curved: frequent, 148

54. *ODONTHALIA DENTATA* Lyngby. Maine and North. 3-12.
55. *CHONDRIA DASYPHYLLA* Agardh. Coast. 6-12.
56. *CHONDRIA BAILEYANA* Montagne. Coast. 6-8.
57. *CHONDRIA TENUISSIMA* Agardh. Boston to New York. 4-6.
58. *CHONDRIA ATROPURPUREA* Harvey. South Carolina and South. 4-10.
59. *RHODOMELA SUBFUSCA* Agardh. New Jersey and North. 6-12.
60. *RHODOMELA GRACILIS* Kützinger. Massachusetts and North. 4-12.
61. *RHODOMELA ROCHEI* Harvey. New Jersey to Massachusetts. 4-8.
62. *POLYSIPHONIA URCEOLATA* Greville. Virginia and North. 6-12.
63. *POLYSIPHONIA FORMOSA* Suhr. New Jersey and North. 4-8.
64. *POLYSIPHONIA SUBTILISSIMA* Montagne. New Jersey and North. 2-4.
65. *POLYSIPHONIA OLNEYI* Harvey. Long Island and North. 3-5.
66. *POLYSIPHONIA HARVEYI* Bailey. Boston to New Jersey. 2-4.
67. *POLYSIPHONIA ELONGATA* Greville. Massachusetts, etc. 6-12.
68. *POLYSIPHONIA FIBRILLOSA* Greville. New Jersey to Massachusetts. 5-8.
69. *POLYSIPHONIA VIOLACEA* Greville. New York and North. 6-82.
70. *POLYSIPHONIA VARIEGATA* Agardh. Coast. 2-8.
71. *POLYSIPHONIA PARASITICA* Greville. Rhode Island, etc. 1-3.
72. *POLYSIPHONIA ATORORUBESCENS* Greville. New Jersey to Rhode Island. 1-3.
73. *POLYSIPHONIA NIGRESCENS* Greville. Coast. 3-15.
74. *POLYSIPHONIA AFFINIS* Moore. Coast. 4-12.
75. *POLYSIPHONIA FASTIGIATA* Greville. New York to Halifax. 1-2.
76. *BOSTRYCHIA RIVULARIS* Harvey. New York to Florida. $\frac{3}{4}$ -1.
77. *DASYA ELEGANS* Agardh. Cape Cod and South. 6-36.
78. *CHAMPIA PARVULA* Harvey. Cape Cod and South. 2-4.
79. *CORALLINA OFFICINALIS* L. New Jersey and North. 2-4.
80. *MELOBESIA PUSTULATA* Lamouroux. Rhode Island, etc.
81. *NULLIPORA POLYPHYLLAMEA* (?). New York and North. (*A. Melobesia*?)

82. GRINNELLIA AMERICANA Harvey. New Jersey to Massachusetts. 4-24.
83. DELESSERIA SINUOSA Lamouroux. New York and North. 3-8.
84. DELESSERIA ALATA Lamouroux. Cape Cod and North. 2-6.
85. DELESSERIA HYPOGLOSSUM Lamouroux. Virginia and South. 3-5.
86. DELESSERIA LE PRIEURII Montagne. West Point and South. 1-2.
87. NITOPHYLLUM LACERATUM Greville. Maine and North. 6-8.
88. NITOPHYLLUM PUNCTATUM Greville. North Carolina and South. 2.
89. CALLIBLEPHARIS CILIATA Kützinger. Massachusetts and North. 2-8.
90. GRACILARIA MULTIPARTITA Agardh. Coast. 6-12.
91. GELIDIUM CORNEUM Lamouroux. Coast. 2-5.
92. SOLIERIA CHORDALIS Agardh. Cape Cod and South. 6-14.
93. HYPNEA MUSCIFORMIS Lamouroux. Cape Cod and South. 4-8.
94. POLYIDES ROTUNDUS Greville. New York to Boston. 2-3.
95. PEYSSONNELIA IMBRICATA Kützinger. Newfoundland.
96. NEMALION MULTIFIDUM Agardh. Long Island and North. 6-10.
97. SCINAIA FURCELLATA Bivona. Rhode Island and South. 2-4.
98. RHODYMENTA PALMATA Greville. (Lulse.) Virginia and North. 6-18.
99. RHODYMENTA PALMETTA Greville. Halifax. 1-3.
100. EUTHORA CRISTATA Agardh. Cape Cod and North. 1-3.
101. PLOCAMUM COCCINEUM Lyngby. Massachusetts. 2-5.
102. CORDYLECLADIA (?) HUNTII Harvey. Rhode Island. 2-3.
103. PHYLOPHORA BRODIEI Agardh. Cape Cod and North. 3-4.
104. PHYLOPHORA MEMBRANIFOLIA Agardh. Cape May and North. 3-4.
105. GYMNOGONGRUS TORREYI Agardh. New York 4-7.
106. GYMNOGONGRUS NORVEGICUS Agardh. Maine. 2-3. Lynn Beach.
107. AHNFELTIA PLICATA Fries. New Jersey and North. 5-10.
108. CYSTOCOLONIUM PURPURASCENS Kützinger. Cape May and North. 6-14.
109. CALLOPHYLLIS LACINIATA Kützinger. Delaware. 3-5.
110. GIGARTINA MAMILLOSA Agardh. Cape Coast and North. 2-3.
111. CHONDROS CRISPUS Lyngby. (Irish Moss.) New Jersey and North. 3-8.
112. CHYLOCLADIA BAILEYANA Harvey. Cape Cod and South. 2-3.
113. CHYLOCLADIA ROSEA Harvey. Long Island to Maine. 1-2.
114. HALOSACCION RAMENTACEUM Ag. New Hampshire and North. 10-14.
115. FURCELLARIA FASTIGIATA Lyngby. Newfoundland. 4-8.
116. GRATELOUPIA GIBBESI. Harvey. South Carolina. 6-20.
117. GRATELOUPIA FILICINA Agardh. Georgia and South. 6-12.
118. GLOIOSIPHONIA CAPILLARIS Carmichael. New England. 4-6.
119. SPYRIDIA FILAMENTOSA Harvey. Coast. 3-10.
120. SPYRIDIA FILAMENTOSA var. REFRACTA Harvey. Massachusetts to Florida. 3-8.
121. CERAMUM RUBRUM Agardh. South Carolina to Greenland. 2-10.
122. CERAMUM HOOPERI Harvey. Cape Cod, North. 1-2.
123. CERAMUM DIAPHANUM Roth. Boston, South. 2-4.
124. CERAMUM FASTIGIATUM Harvey. Virginia to Maine. 2-4.
125. CERAMUM ARACHNOIDEUM (?) Agardh. New Jersey to Massachusetts. 1-2.
126. PTILOTA SERRATA Kützinger. Cape Cod and North. 4-6.
127. PTILOTA PLUMOSA Agardh. Halifax, North. 4-5.
128. PTILOTA ELEGANS Bonnemaison. Boston, South. 3-5.
129. HALURUS EQUISETIFOLIUS Kützinger. New York (?) 6-8.
130. GRIFFITHSIA CORALLINA Harvey. Boston, South. 3-3.
131. CALLITHAMNION TETRAGONUM Agardh. New England. 3-4.
132. CALLITHAMNION BAILEYI Harvey. New York to Massachusetts. 2-3.
133. CALLITHAMNION BORRERI Agardh. New York to Cape Cod. 1-3.
134. CALLITHAMNION POLYSPERMUM Agardh. New York and South. 2-3.
135. CALLITHAMNION BYSSOIDEUM Arn. New Jersey to Massachusetts. 1-3.
136. CALLITHAMNION DIETZLÆ Hooper. Long Island. 2-3.
137. CALLITHAMNION CORYMBOSUM Agardh. New York and North. 2-3.
138. CALLITHAMNION SEIOSPERMUM Griffiths. New York to Maine. 3-5.
139. CALLITHAMNION PLUMULA Lyngby. Long Branch and Penikese, 1-2.

140. *CALLITHAMNION AMERICANUM* Harvey. New York and North. 3-4.
 141. *CALLITHAMNION PYLAISEI* Montague. Cape Cod and North. 3-4.
 142. *CALLITHAMNION FLOCCOSUM* Agardh. Massachusetts. 4-6.
 143. *CALLITHAMNION CRUCIATUM* Agardh. New York. 1-1½.
 144. *CALLITHAMNION TURNERI* Agardh. Coast. ½-1.
 145. *CALLITHAMNION LUXURIANS* Agardh. New York and North.—
 146. *CALLITHAMNION ROTHII* Lyngby. Connecticut.—
 147. *CALLITHAMNION VIRGATULUM* Harvey. New York.—
 148. *CALLITHAMNION DAVIESII* Agardh. Massachusetts.—
 149. *CALLITHAMNION TENUE* Harvey. New Jersey. 3-4.

PART III. CHLOROSPERMEÆ.

(GREEN ALGÆ.)

PLANTS grass-green, rarely brownish, bluish or purple, a few low forms red. Propagation in our species by simple cell-division, or by transformation of the coloring matter (endochrome) of the cells of the whole or a part of the frond, into zoospores. In all waters and damp places.* **A**

- A.** *Fronds filamentous, articulated; endochrome diffused: spores small.* CONFERVACEÆ. **H**
- A.** *Fronds various, never truly jointed.* **B**
- B.** *Frond tubular and hollow often branched or else broad and flat, membranous, composed of simple quadrate cells.* **C**
- B.** *Fronds composed of a simple filiform often profusely branching cell, or of many such cells united into a sponge-like body; often bright green and plume-like.*
 SIPHONACEÆ. **E**
- B.** *Frond with an annulated pith, composed of very short cellulules, surrounded by a membranous, inarticulate, tubular sheath.* OSCILLATORIACEÆ. **I**
- B.** *Microscopic, unicellular; growth by semisection of the cell.* **D**
- C.** *Color bright green at all times.* ULVACEÆ. **G**
- C.** *Olivaceous or purplish, becoming bright purple when dry or in fruit.* PORPHYRACEÆ. **F**

* For descriptions of our numerous fresh water Chlorosperms and for a more recent arrangement of families than the one here adopted, see Prof. H. C. Wood's excellent "Contributions to the History of the Fresh Water Algæ of North America."

- D.** *Green—cell-walls membranous; fresh water—chiefly or entirely.* **DESMIDIACEÆ.***
- D.** *Yellow brown; cell-walls silicious.* **DIATOMACEÆ.***
- E.** Frond sponge-like, of densely interwoven filaments, . . . *Codium.* **J**
- E.** Filaments free, plume-like, pinnately branched, . . . *Bryopsis.* **L**
- E.** Filaments numerous, tufted or matted at base, free above, irregularly branched, *Vaucheria.* **K**
- F.** Frond tubular, *Bangia.* **N**
- F.** Frond flat, simple or cleft, *Porphyra.* **M**
- G.** Frond flat, sometimes saccate while young, *Ulva.* **Q**
- G.** Frond tubular, often branched, *Enteromorpha.* **O**
- H.** Filaments tufted, branched, *Cladophora.* **S**
- H.** Filaments unbranched; nodes not constricted, . . . *Chaetomorpha.* **b**
- H.** Filaments unbranched; constricted at the nodes; joints very short, *Hormotrichum.* **f**
- I.** Filaments long, flexible, bundled together, *Lyngbya.* **g**
- I.** Filaments short, tufted, erect, fixed at base, *Calothrix.* **l**
- I.** Filaments rigid, needle-shaped, lying loosely in a mucous matrix; vividly oscillating; commonly floating, . . . *Oscillatoria.**
- J.** Fronds erect, dichotomous, clothed with soft hairs, **149**
- K.** Not much branched; cell walls thin, **150**
- L.** Common and variable; with a bright glassy lustre when dry, . . . **151**
- M.** Fruit— minute dark purple granules, arranged in fours, . . . **152**
- N.** In fresh or salt water forming large dark purple patches, . . . **153**
- N.** Forming a minute rosy down on Chondria, etc., **154**
- O.** Frond never branched, large and bag-like when fully grown, . . . **155**
- O.** Frond branched; branches simple, obtuse, **156**
- O.** Frond branched; branches beset with branchlets, **P**
- P.** Fronds slender, tufted, **157**
- P.** Fronds very fine and feathery; branchlets articulated, confervula-like, **158**
- Q.** Membrane formed of a double layer of cells; **R**
- Q.** Membrane formed of a single layer of cells; semi-transparent; frond very delicate, saccate while young, becoming cleft; adheres closely to paper, **161**
- R.** Frond lanceolate, composed of two closely applied membranes; adheres to paper, **159**
- R.** Frond polymorphous, flat, smooth and glossy; common, . . . **160**
- S.** Filaments rigid, dark green tufted, cell walls thick; joints 3 to 4 times as long as broad, **162**
- S.** Filaments soft, forming dense, spongy fastigate pale green tufts, **T**
- S.** Filaments loosely tufted, stout, scarcely collapsing when drawn from the water; vivid green; joints 3 to 6 times as long as broad, **a**

- S.** Dull green, scarcely adhering to paper; branches few, spreading with wide axils; in brackish or fresh waters, **175**
- S.** Not as above; filaments loosely tufted sometimes interwoven, feathery, very slender; pale or bright green, **V**
- T.** Joints below about twice—above, 6 to 8 times as long as broad, **U**
- T.** Joints uniformly about twice as long as broad; tufts short, globose **165**
- U.** Tufts starry, of a brilliant glossy green retained in drying, . . . **163**
- U.** Tufts globose small, yellow-green; on small algæ, **164**
- V.** Joints 6 to 10 times longer than broad; bright yellow-green, . . **171**
- V.** Joints 3 to 5 times longer than broad; pale or yellow-green; not adhering closely to paper, **Z**
- V.** Joints 2 to 4 times as long as broad; mostly adhering to paper, **W**
- W.** Dark or brilliant green (often drying pale); nodes not constricted; excessively branched, **Y**
- W.** Pale or glaucous green; nodes mostly constricted, **X**
- X.** Excessively branched; ultimate divisions second-pectinate; joints uniformly three times as long as broad, **166**
- X.** Less branched, with longer joints; main branches long, flexuous, almost naked, **167**
- Y.** Rather rigid; branches recurved-pectinate; joints 2 to 4 times as long as broad, **169**
- Y.** Stems long, flexuous; branches long, with short branchlets; joints shorter, **168**
- Z.** Pale greenish, forming spongy tufts; nodes slightly constricted, **170**
- Z.** Yellow green; very flexuous; forming silky tufts, **172**
- a.** Bright yellow green, fading when dry: branches crowded, . . . **173**
- a.** Full green; branches distant, nearly naked, **174**
- b.** Joints 3 or more times as long as broad, **c**
- b.** Joints $1\frac{1}{2}$ to 3 times as long as broad, **d**
- b.** Joints not longer than broad, yellowish, rather rigid but collapsing when drawn from the water, **178**
- c.** Very rigid, glossy green; not adhering to paper; deep water, **176**
- c.** Pale and flaccid; nodes very long, swollen, pale green, **180**
- d.** Soft and flaccid; adhering closely to paper, **179**
- d.** Coarse and rigid, dark green; filaments straight, **177**
- d.** Filaments twisted, very slender but somewhat harsh, **e**
- e.** Mostly floating; joints less than twice as long as broad, **181**
- e.** On rocks, etc., joints twice as long as broad or more, **182**
- f.** Joints about as long as broad; substance rather firm, **183**
- f.** Joints twice as broad as long, substance rather soft, **184**
- g.** Cell walls thick, **h**
- g.** Cell walls thin, **i**
- h.** In large dark green tufts; filaments thick and tenacious, . . . **185**
- h.** On rocks, etc., rusty or olivaceous; filaments upright in the water, **187**
- i.** Northern species, floating in mats in stagnant salt waters or spreading in thin strata on mud, **j**

- i. Southern, blackish green, floating or attached to small algæ, . . . k
- j. Bluish green or rusty red; filaments tenacious, . . . 186
- j. Blackish green or violaceous; filaments not half so stout as in
the preceding. 188
- k. Filaments 1 to 2 inches long; scarcely interwoven; the endo-
chrome not very distinctly annulated. 189
- k. Minute; filaments densely matted together; annulations more
distinct. 190
- l. In little starry tufts on the smaller algæ. 191
- l. In velvety patches on rocks, etc. m
- m. Filaments flexuous, simple; common on rocks, rendering them
very slippery. 192
- m. Filaments longer and straighter, often appearing branched, by
the splitting of the endochrome ("viviparous"), 193

- 150. CODIUM TOMENTOSUM Stackh. Flórida. 3-24.
- 151. VAUCHERIA (species undescribed in Phycologia Britannica, allied to *V. marina*)
Buzzard's Bay, etc. 2-3.
- 152. BRYOPSIS PLUMOSA Lamouroux. Massachusetts and South. 3-6.
- 153. PORPHYRA VULGARIS Agardh. Charleston and North. 2-10.
- 154. BANGIA FUSCOPURPUREA Lyngby. New Jersey and North. 2-3.
- 155. BANGIA CILIARIS Carmichael. South Carolina. One-tenth.
- 156. ENTEROMORPHA INTESTINALIS Link. Whole Coast. 3-10.
- 157. ENTEROMORPHA COMPRESSA Greville. Whole Coast. 3-8.
- 158. ENTEROMORPHA CLATHRATA Greville. Cape May and North. 2-6.
- 159. ENTEROMORPHA HOPKIRKI McCalla. New York, Massachusetts. 3-4.
- 160. ULVA (PHYCOSERIS) LINZA Linnæus. New Jersey and North. 6-12.
- 161. ULVA (PHYCOSERIS) LATISSIMA Linnæus. Whole Coast. 6-24.
- 162. ULVA LACTUCA Linnæus. Massachusetts, Texas. 6-12.
- 163. CLADOPHORA RUPESTRIS Linnæus. Maine and North. 2-8.
- 164. CLADOPHORA ARCTA Dillwien. New Jersey and North. 2-3.
- 165. CLADOPHORA LANOSA Roth. Massachusetts. 1-1½.
- 166. CLADOPHORA UNCIALIS Flora Danica. Cape Cod and North. 1.
- 167. CLADOPHORA GLAUDESCENS Griffiths. Whole Coast. 3-5.
- 168. CLADOPHORA FLEXUOSA Griffiths. New Jersey and North. 3-5.
- 169. CLADOPHORA MORRISIE Harvey. Delaware. 6-8.
- 170. CLADOPHORA REFRACTA Roth. Whole Coast. 2-3.
- 171. CLADOPHORA ALBIDA Hudson. New York, Massachusetts. 6-8.
- 172. CLADOPHORA RUDOLPHIANA Agardh. New York. 4-5.
- 173. CLADOPHORA GRACILIS Griffiths. New York-Maine. 4-12.
- 174. CLADOPHORA LÆTEVIRENS Dillwien. Coast. 3-8.
- 175. CLADOPHORA DIFFUSA (?) Harvey. New York. 6-12.
- 176. CLADOPHORA FRACTA Flora Danica. New Jersey-Massachusetts. 4-8.
- 177. CHÆTOMORPHA PIQUOTIANA Montagne. New Jersey and North. 12-16.
- 178. CHÆTOMORPHA MELAGONIUM Web. and Mohr. New York and North. 5-12.
- 179. CHÆTOMORPHA ZEEA Dillwien. New Jersey-Massachusetts. 3-12.
- 180. CHÆTOMORPHA OLNEYI Harvey. Rhode Island and Massachusetts. 3-10.
- 181. CHÆTOMORPHA LONGIARTICULATA Harvey. New England. 3-4.
- 182. CHÆTOMORPHA SUTORIA Berkeley. Connecticut. 3-8.
- 183. CHÆTOMORPHA TORTUOSA Dillwien. Cape Cod and North. 3-4.
- 184. HORMOTRICHUM YOUNGANUM Dillwien. Cape May-Cape Cod. 1-3.
- 185. HORMOTRICHUM CARMICHAELI Harvey. Boston and North. 1-3.
- 186. LYNGBYA MAJUSCULA Harvey. Whole Coast. 1-2.
- 187. LYNGBYA FERRUGINEA Agardh. Coast. 1-2.

188. *LYNGBYA FULVA* Harvey. Connecticut. 1-2.
 189. *LYNGBYA NIGRESCENS* Harvey. New Jersey-Massachusetts. 1.
 190. *LYNGBYA CONFEROIDES* Agardh. South Carolina. 1-2.
 191. *LYNGBYA PUSILLA* Harvey. South Carolina. $\frac{1}{4}$.
 192. *CALOTHRIX CONFERVICOLA* Agardh. Coast. One-tenth.
 193. *CALOTHRIX SCOPULORUM* Agardh. Coast. One-twentieth.
 194. *CALOTHRIX VIVIPARA* Harvey. Long Island to Massachusetts. Three-tenths.

ADDITIONS.

Dr. W. G. Farlow in Professor Baird's "Report on Fish and Fisheries, 1873," gives the following additional species, localities, etc. :—

Ralfsia verrucosa Ag. Little Nahant—only known station in America.

Myriotrichia filiformis Griff. Point Judith.

Fucus distichus L. Marblehead.

Fucus furcatus L. Massachusetts Coast.

Melobesia polymorpha L. Robbinstown, Mass.

Melobesia membranacea Lam. Common along the coast on *Zostera*.

Melobesia pustulata Lam. On Fuci, Chondrus, etc. Coast of Massachusetts.

Hildenbrandtia rubra. Wood's Hole to New Haven.

Gymnogongrus Norvegicus Grev. Lynn Beach.

A slender species of *Gracilaria* supposed to be *G. confervoides* Grev. picked up on Long Island.

Chrysomenia (Chylocladia) rosea Harvey. Gay Head.

Callithamnion plumula Lyngby. Gay Head. Orient Point.

Chondria littoralis Ag. Wood's Hole, Mass. (Key West. Harvey.)

Dr. Farlow regards *Sargassum Montagnei* as a variety of *S. vulgare*, and thinks *Callithamnion Baileyi* a warm water variety of *C. tetragonum*.

ETYMOLOGY OF NAMES OF GENERA.

Agarum Bory St. Vincent. A Mushroom(?)
Ahnfeltia Ag. For Ahnfelt, a German botanist.

Alaria Grev. Winged.

Arthrocladia Duby. Jointed branch (in "Key" *Arthrocladia*, by error).
Aspercoccus Hooker. Rough-seeded.

Bangia Lyngb. For Hoffman Bang, a Danish botanist.

Bostrychia Mont. Ox-hair.

Bryopsis Lam. Moss-like.

Calliblepharis Kütz. Beautiful eye-lashes.
Callithamnion Lyngb. Beautiful little shrub.

Calophyllis Kütz. Beautiful leaf.

Calothrix Ag. Beautiful hair.

Ceramium Roth. A pitcher (but the fruit is not pitcher shaped).

Chatomorpha Kütz. Bristle-form.

Champia Desv. A personal name.

Chondria Ag. Cartilaginous.

Chondrus Stackhouse. Cartilage.

Chorda Stackhouse. A cord.

Chordaria Agardh. Cord-like.

Chrysomenia Ag. A golden membrane.

Chylocladia Greville. Juicy branched.

Cladophora Kützng. Branch-bearing.

Cladostephus Ag. Branch-crowned.

Codium Stackhouse. Skin of an animal.

Corallina Linnaeus. A little coral.

Cordylecladia Ag. Cord-like branches(?)
Cystoclonium Kütz. Bladdery branches.

Dasya Ag. Hairy.

Delesseria Lamouroux. For Baron Delessert, a French botanist.

Desmarestia Lam. For Desmarest, a French naturalist.

Dictyosiphon Lyngby. Netted tube.

Ectocarpus Lyngb. External fruit.

Elachista Duby. Smallest.

Enteromorpha Link. Intestine-shaped.

Euthora Ag.

Fucus L. Greek—a sea-weed.

Furcellaria Lam. Forked.

Gelidium Lam. Ice-like or jelly-like.

Gigartina Lam. A grape-seed (from the shape of the tubercles).

Gloiosiphonia Carmichael. Viscid-tubed.

Gracilaria Grev. Slender.

Grateloupia Ag. For Dr. Grateloup, a French algologist.

Griffithsia Ag. For Mrs. Griffiths, "the most distinguished of British algologists."

Grinnellia Harvey. For Henry Grinnell, of New York.

Gymnogongrus Martius. Naked warts.

Halidrys Lyngby. Sea-oak.

Halosaccion Kütz. Sea-bag.

Halurus Kütz. Sea-tail (?).

Hildenbrandtia Nardo. For *Hildenbrandt*.

Hormotrichum Kütz. Necklace-hairs.

Hypnea Lam. From *Hypnum*, a genus

of mosses.

Laminaria Lam. From lamina, a plate or blade.

Leathesia Gray. For G. R. Leathes, a British naturalist.

Lyngbya Ag. For Hans Christian Lyngby, a noted Danish algologist.

Melobesia Lam. Name of a sea-nymph.

Mesogloia Ag. Viscid pith.

Myrionema Grev. Myriad threads.

Myriotrichia Harvey. Myriad hairs.

Nemalion Tozzetti. A crop of threads.

Nitophyllum Greville. Shining leaf.

Nullipora L. Without pores.

Odonthalia Lyngb. Toothed-branch.

Oscillatoria Vaucher. Oscillating.

Peyssonelia Decaisne. For J. Peyssonel, an algologist.

Phyllophora Grev. Leaf-bearing.

Plocamium Lam. Braided-hair.

Polyides Ag. Many-formed.

Polysiphonia Grev. Many-tubed.

Porphyra Ag. Purple.

Ptilota Ag. Pinnated.

Punctaria Grev. Dotted.

Ralfsia Berkeley. For John Ralfs, an English diatomist.

Rhodomela Ag. Red-black.

Rhodymenia Grev. A red membrane.

Sargassum Rumph. Sargazo in Spanish.

Scinaia Bivona.

Seirospora Harvey. Chain-seeds.

Solieria Ag. For Solière, a French algologist.

Sphacelaria Lyngb. Gangrened (from the withered fruiting tips).

Spyridia Harvey. Basket-like.

Stilophora Ag. Dot-bearing.

Striaria Grev. Striated.

Ulva Linn. Ul—water in Celtic.

Vaucheria De Candolle. For Vaucher, a Swiss confervologist.

REVIEWS AND BOOK NOTICES.

THE UNITED STATES FISH COMMISSION REPORT.*—The valuable report of Prof. Baird, with the supplementary papers by Profs. Verrill, Gill, Smith and others, is not only a readable but exceedingly handy work for reference. How manifold are the subjects relating to a proper inquiry into the food and habits of our fishes may be gathered from the pages of this report. Not only have we full data concerning the practical questions relating to the fisheries, but Prof. Baird has called to his aid a number of naturalists, chemists and physicists, all whose investigations bear on the subject of our fisheries, the most abstruse matters having an immediate practical interest. It was thus found necessary to study the peculiarities in the temperature of the water at different depths, its chemical constitution, the percentage of carbonic acid gas and ordinary air, its currents, etc., besides thorough investigations with the dredge. The report relating exclusively to the fisheries occupies 280 pages of the volume, and is accompanied by woodcuts, diagrams, and a map designed to show more particularly the dis-

* United States Commission of Fish and Fisheries. Part 1. Report on the Condition of the Sea Fisheries of the South Coast of New England in 1871 and 1872. By Spencer F. Baird, Commissioner. With Supplementary Papers. Washington, 1873. 8vo. pp. 852, with a map and 40 plates. Verrill's Report separate. Naturalists' Agency. \$3.00.